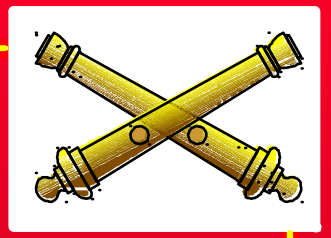
GUNNERY
DEPARTMENT



THE KING OF BATTLE

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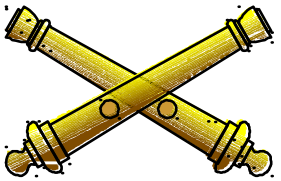
DEPARTMENT



BCS TROUBLE SHOOTING

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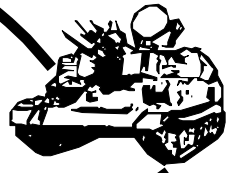
FIVE REQUIREMENTS FOR ACCURATE PREDICTED FIRE

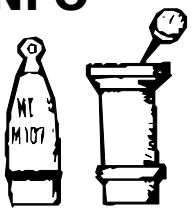
4
ACCURATE METRO INFO

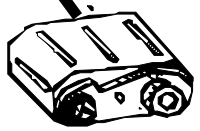


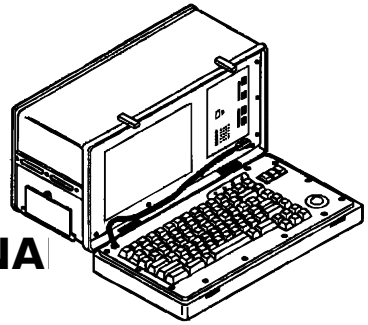
1
ACCURATE TARGET LOCATION & SIZE

2
ACCURATE BATTERY LOCATION

3
ACCURATE AMMO& WPN INFO







5
ACCURATE COMPUTATIONAL PROCEDURES

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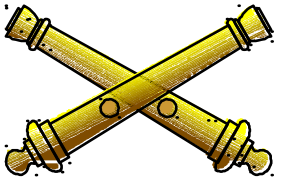
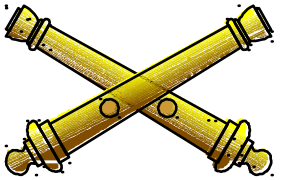


TROUBLE SHOOTING

- ISOLATE PROBLEMS
- USE A SYSTEMATIC APPROACH TO CORRECT THE FAULT

GUNNERY DEPARTMENT



CORRECTING THE FAULT

ASK THE FOLLOWING QUESTIONS:

- **IS IT AFFECTING MY ENTIRE BATTERY?**
- **IS IT AFFECTING JUST ONE GUN?**
- **IS IT A RANGE ERROR?**
- **IS IT A LATERAL ERROR?**
- **IS IT A RANGE AND LATERAL ERROR?**
- **DID THE SOLUTION SOLVE THE ENTIRE PROBLEM?**

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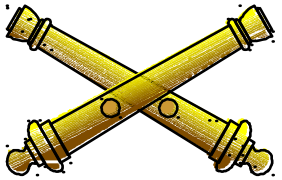

SITE ERROR

BCS (CHG 4 GB RG 5000) ACTUAL

TGT 400	TGT 350
- PLT 368	- PLT 368
VI = +32	VI = - 18
SITE = +7	SITE = - 4

GO TO COL 5 TBL F, TFT - CHANGE IN RANGE FOR A CHANGE IN 1 MIL OF ELEVATION

			(TBL F TFT)	
BCS	+7mils	X	*13M*	= +91M
- ACTUAL	-4 mils	X	*13M*	= - (- 52M)
= ERROR				+143M

(EXPRESS TO NEAREST 10 M) **OVER 140 M**

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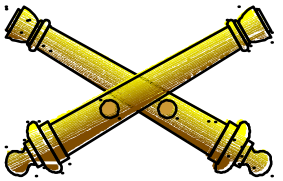
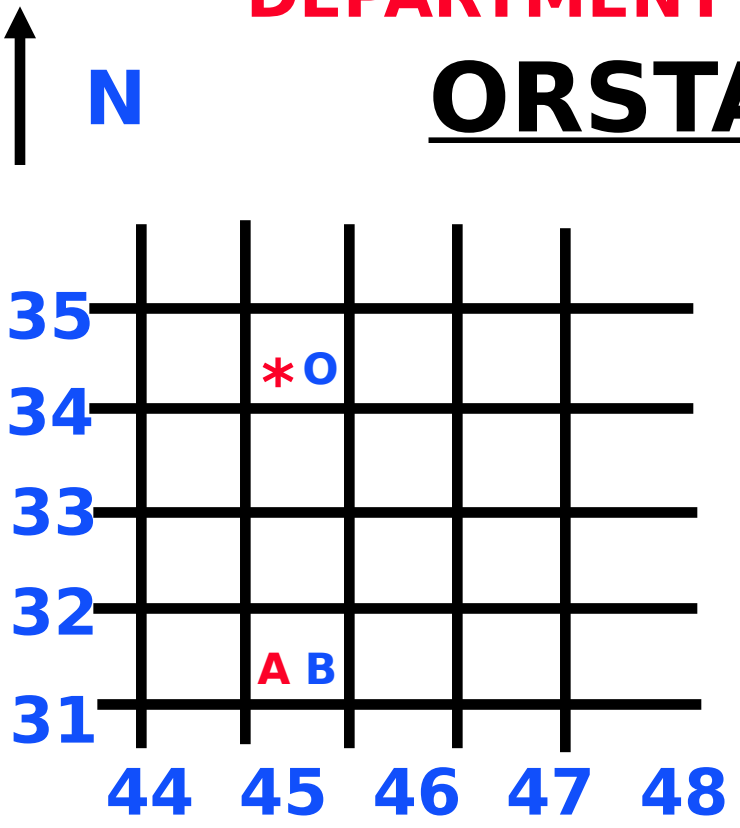


ORSTA ERROR



B = BCS ORSTA
A = ACTUAL ORSTA

DIR OF FIRE 6400

BCS 45810 31442 400
- ACTUAL 45310 31442 400
=ERROR 500 M WEST

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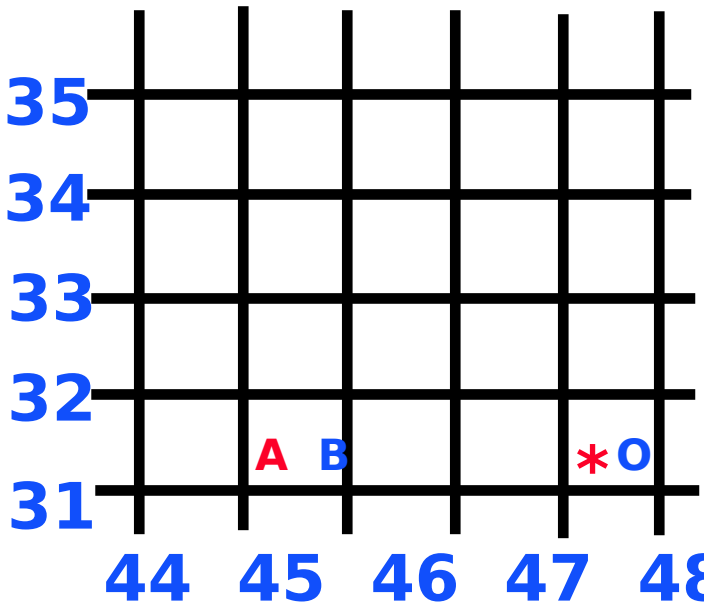
GUNNERY
DEPARTMENT

ORSTA ERROR



B = BCS ORSTA
A = ACTUAL ORSTA

DIR OF FIRE 1600

BCS 45810 31442 400
- ACTUAL 45310 31442 400
=ERROR 500 M WEST

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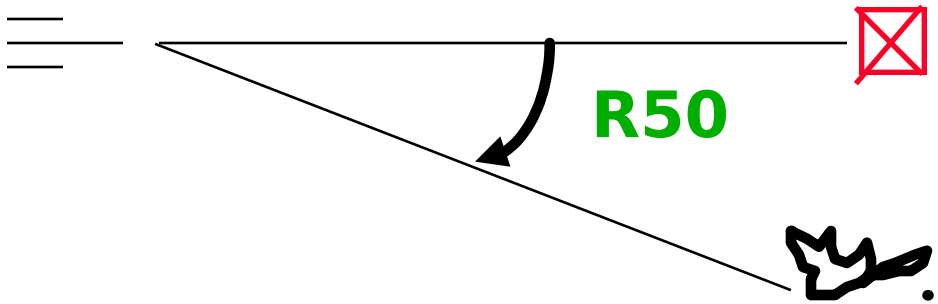
GUNNERY DEPARTMENT

AZIMUTH OF LAY ERROR

CHG 5WB RG 5700M



ACTUAL AOL 1650

- BCS AOL 1600

=ERROR (RALS) R50 mils

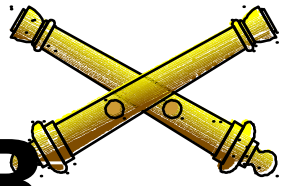
x RG (1000'S) 5.7

R285M / 1.0186 = R279.8

(EXPRESS TO NEAREST 10 M) RIGHT 280M

USAFAS

GUNNERY DEPARTMENT



SQUARE WEIGHT ERROR

FIRING CHG 8 AT RG 16000M

BCS HE PROJECTILE WT 93.9 LBS = 3
ACTUAL HE PROJECTILE WT = 6

GO TO COL 18&19 TBL F TFT FOR RANGE CORR FOR CHANGE IN SQUARE WEIGHT

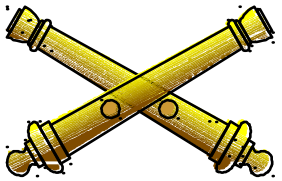
(TBL F TFT)

BCS D = 1 X *+24M* = +24M
- ACTUAL I = 2 X *- 22M* = - 44M
=ERROR +68M

(EXPRESS TO NEAREST 10 M) **OVER 70M**

USAFAS

GUNNERY DEPARTMENT



PROPELLANT TEMPERATURE ERROR

FIRING CHG 6WB AT RNG 9000M

BCS PROP TEMP = 84 --> +1.1M/S
(TBL E TFT)

ACTUAL PROP TEMP = 48 --> - 1.8M/S
(TBL E TFT)

GO TO COL 10 & 11 TBL F TFT FOR RANGE CORR FOR +/-1M/S CHANGE IN MUZZLE VELOCITY

(TBL F TFT)

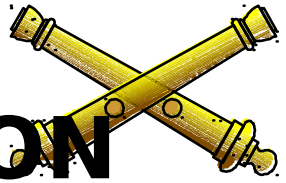
BCS I1.1M/S X *- 20.4M* = - 22.4M

- ACTUAL D1.8M/S X *+ 20.6M* = + 37.1M

= ERROR -

USAFAS

GUNNERY DEPARTMENT



MUZZLE VELOCITY VARIATION ERROR

FIRING AN M109A3 CHG 5WB@ RG 6000M

BCS (HE/M107) MV = 395.5 M/S

ACTUAL (HE/M107) MVV = -15.5 M/S

(STD MV FROM TFT)

BCS MVV =395.5M/S - *397.0 M/S* = -1.5 M/S

GO TO COL 10 & 11 TBL F TFT FOR RANGE CORR FOR +/-1M/S CHANGE IN MUZZLE VELOCITY

(TBL F TFT)

BCS => D1.5 M/S X +*16.2M* = +24.3M

- ACTUAL => D15.5 M/S X +*16.2M* = +251.1M

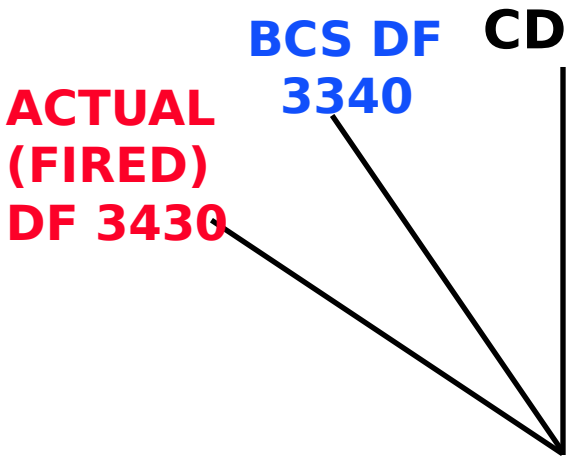
=ERROR - 226.8M

(EXPRESS TO NEAREST 10 M) **SHORT 230M**

USAFAS

GUNNERY DEPARTMENT

DEFLECTION FIRED ERROR



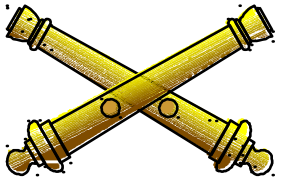
CHG 7WB
RANGE 10,800M

ACTUAL (FIRED) DF 3430
- BCS (COMPUTED) DF 3340
=ERROR (LARS) L90
mils
X RG (1000'S)
10.8

L972
L972 / 1.0186 = L954.2
(EXPRESS TO NEAREST 10 M) LEFT

USAFAS

GUNNERY DEPARTMENT



CHARGE ERROR

GUN #1 FIRED SH HE CHG 5GB DF 3187 QE 35

BCS COMPUTED SH HE CHG 4GB DF 3187 QE 350

ASSUME SI = 0, NO OTHER ERRORS EXIST

(TBL F TFT)

ACTUAL RG ACHIEVED *6700* ***(INTERPOLATE TO NEAREST 10***

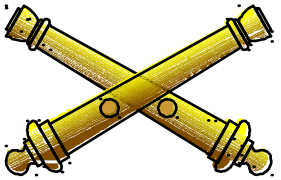
- BCS RG COMPUTED 5560

=ERROR +1140M

(EXPRESS TO NEAREST 10 M) **OVER 1140 M**

USAFAS

GUNNERY DEPARTMENT



TROUBLE SHOOTING TECHNIQUES

1. IS THE ERROR GUN SPECIFIC OR ENTIRE BATTERY?
2. IS THE ERROR IN DEFLECTION, RANGE, OR HEIGHT OF BURST?
3. ONCE THE ERROR IS ISOLATED, WAS THE ERROR OF THE CORRECT MAGNITUDE AND IN THE CORRECT DIRECTION?
4. ARE THERE ANY OTHER ERRORS?
5. HAS THE DATABASE BEEN VERIFIED?
6. HAS THE GUNLINE BEEN VERIFIED?

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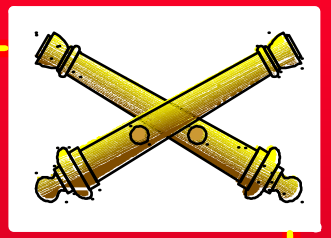
GUNNERY
DEPARTMENT



THE KING OF BATTLE

USAFAS